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ABSTRACT

This learning module, which is part of a management and supervisor training program for managers and supervisors employed at the Department of Energy's Waste Isolation Division, is designed to teach trainees to apply conduct of operations principles to their area(s) of responsibility. The following topics are covered in the module's individual sections: teamwork; operations organization and administration; shift routines and operating practices; work area activities; communications; control of on-the-job training; investigation of abnormal events; notifications; control of equipment and systems status; lockouts and tagouts; independent verification; log keeping; operations turnover; operations aspects of facility chemistry; required reading; timely orders to operators; operations procedures; operator aid postings; and equipment and piping labeling. Each section includes some or all of the following: enabling objectives, an exercise requiring trainees to evaluate a manager's effectiveness in a given scenario, and lists of good practices and practices to avoid. Concluding the module are a list of "smart moves," 22-item reference list, practice test, and test answers. Appended is the phonetic alphabet. (MN)

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ED 395 161

Waste Isolation Division
Management and Supervisor Training (MAST) Program

CONDUCT OF OPERATIONS MAS-121

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A. INTRODUCTION

Terminal Objective

Upon completion of this module, the trainee will be able to apply Conduct of Operations principles to his or her area of responsibility.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the module examination.

Conduct of Operations is a philosophy of performing work in a rigorous, disciplined, formal manner.

These principles originated in the nuclear ships of the U.S. Navy under Admiral H.G. Rickover. Following the Three Mile Island accident, the Conduct of Operations philosophy was adopted by the commercial nuclear industry. Later, the DOE followed suit by issuing DOE Order 5480.19, "Guidelines for the Conduct of Operations at DOE Facilities." At the WIPP, the philosophy is implemented by WP 04-AD3002, "Conduct of Shift Operations," and the Westinghouse Conduct of Operations Manual.

A common misconception is that "Conduct of Operations" applies only to Operations personnel. While the Westinghouse Conduct of Operations Manual, DOE Order 5480.19, and WP 04-AD3002 specifically target Operations, the "Conduct of Operations" philosophy can and should be applied to all disciplines as appropriate.

A more appropriate title for this module might be Conduct of Business. Many of the principles that make for disciplined facility operations can help you be a more efficient manager/supervisor.

The documents named above are full of good principles for improving teamwork, eliminating errors, and preventing double work. Applying these principles to your area will make your job easier while improving the quality of your product or service.

This module will show you how to:

- find and solve small problems before they grow into big ones
- use good ownership practices to improve your employees' performance

- cut down or eliminate double work
- minimize errors by on-the-job trainees
- determine the precise cause of a work process abnormality, good or bad
- minimize errors that result from turning over ongoing work from one person to another
- ensure your employees read and understand essential information in a timely manner
- use indicators and goals to improve performance

These and the other principles detailed in this module are of use to every manager/supervisor. George Toto, a key contributor to the Westinghouse Conduct of Operations Manual, explains this philosophy best in his introduction to the manual:

> "Conduct of Operations is not solely a manual or a DOE order, it is an operating philosophy of a way of doing business. All segments of our business must evaluate their activities and the tools of this manual and implement all of the elements in a graded approach."

A graded approach recognizes that not every employee requires in-depth training on every aspect of Conduct of Operations. For many employees, the overview of Operations provided in General Employee Training is sufficient. For others, in-depth training is required. Technical Training offers several Conduct of Operations courses to meet those needs.

This module presents the principles behind the Conduct of Operations philosophy as detailed in WP 04 AD-3002, DOE 5480.19, and the Conduct of Operations Manual. Many topics touched on here are covered in detail in other MAST modules. It is up to you and your manager to implement these principles in your workplace as required and as appropriate.

B. TEAMWORK

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify his or her role in the safe and efficient operation of the WIPP.
2. Identify good practices for teamwork at the WIPP.
3. Given a scenario, evaluate the manager's effectiveness in promoting good teamwork practices.

You and your employees have a role in the safe and efficient operation of the WIPP. Even if you are not part of Operations, the tasks that you are charged with support the final products and services of WID. No matter what your job, a customer looks to you to provide a product or service in an efficient and timely manner. This internal WID customer, like our primary external customer -- the DOE, is vital to your success.

It is important to identify your customers. For those of us who represent WID to the DOE, identifying the customer is easy. For others, identifying the customer is not as simple.

If you and your employees provide a support function, your customer is the individual or group who depends on you for support. For a health physics technician preparing a Radiation Work Permit, the customer is the cognizant supervisor who initiated the permit. For an engineer preparing a controlled drawing, the customers are the operators, regulators, engineers, and all other potential users of the drawing. For a data entry clerk, the customers are those people who will use the data. No matter what your duties, someone in the organization depends on you and your employees for quality products and services.

One definition of quality is meeting all of your customer's needs. This means providing services or products that are complete. If you perform a service, do a thorough job. If you assemble a product, assemble as complete a product as is needed. Part of your task is making the job of the person you support easier.

"That is not my job" is an inappropriate way of approaching duties. This is not to say that you should perform someone else's job, however, you should do what you can within your

assigned duties to make the next person's job easier. This type of teamwork is needed in order to safely and efficiently operate the WIPP.

Encourage your employees to openly communicate with you and other managers. Solicit your employees' input on section goals, performance standards, and work methods. In safety meetings, remind employees of WID's open door policy: if an employee does not feel comfortable approaching you with a problem, he or she can make an appointment with the department manager, the Human Resources Manager, or the Division General Manager. Employees can also submit an Employee Concern Form. These forms are available in the foyer to the Support Building and at various other locations on site.

Keep communications flowing upward, in good and bad times. Encourage employees to elevate problems when appropriate. Follow the good communication practices listed in MAS-110, Employee Relations, and MAS-106, Communications.

Track the amount of time you spend in your employees' working spaces. The Westinghouse Conduct of Operations Manual recommends that you spend 25-35% of your time in working spaces outside of your office.

Another good practice is to establish the expectation that your employees will treat those in other disciplines and sections with dignity and respect. Animosity and disrespect undermine teamwork. Part of every employee's job is to participate in creating a harmonious workplace.

The question for each employee and manager/supervisor to ask is, "How can I help within the context of my job?"

C. OPERATIONS ORGANIZATION AND ADMINISTRATION

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify methods used to formally administer facility operations.
2. Identify good practices for monitoring and improving employee performance.
3. Identify good practices for monitoring and improving group performance.
4. Given a scenario, evaluate the manager's effectiveness in monitoring formal administration practices.

Operations Department activities are administered in a formal manner using several methods. These include:

- using procedures to implement policy
- monitoring Operations performance
- ensuring that the department has sufficient resources to meet management expectations
- holding employees and their supervisors accountable for their performance in conducting plant activities
- ensuring that employees are trained

These methods can be applied equally well to the organizations that support the Operations Department.

Management establishes operating standards in written policies. These policies are implemented by operating procedures. Operations organization and administrative policies for the WIPP are expressed in the following:

- WID MC, "Waste Isolation Division Charters"
- WP 04-AD3002, "Conduct of Shift Operations"

Conservative Operation

In accordance with WID policy, the WIPP is operated in a manner that gives top priority to safety. Operations procedures, which reflect this policy, govern facility operation under reasonable facility conditions. In any scenario for which there is no procedure, operators are instructed to operate the facility so as to:

- minimize risk of
  -personnel injury
  -exposure of personnel to hazards
  -hazardous material release to the environment
- protect facility equipment
- protect experimental data

It is essential for any employee, if faced with an abnormal condition, to take a safe course of action. Any consideration based on continued production is secondary.

A list of principles of conservative operations is included in chapter 1 of the Westinghouse Conduct of Operations Manual.

Resources

The lines of authority for Operations are displayed on the WID organization chart. Responsibilities for each Operations manager/supervisor are detailed in WID MC, "Waste Isolation Division Charters."

Operations is staffed with the intent of minimizing overtime while fulfilling management performance expectations. The same staffing philosophy applies to technical personnel needed to support Operations. Fatigue or lack of rest due to overtime work can impair employee performance.

Rules for control of overtime are found in Management Policy 4.5, "Operational Overtime." Managers should review individual overtime monthly.

Monitoring of Operating Performance

Many techniques may be used to monitor and improve performance in your area. One source of performance feedback is the formal investigation of causes of abnormalities described in the "Investigation of Abnormal Events" section of this module.

Another good practice is to routinely observe your employees as they perform operating duties. This technique is called "walking your spaces." It involves keeping a critical eye on

all activities. The objective is to constantly improve the product or service you are responsible for while maintaining workplace safety. Part of the method is walking through procedures or work routines with employees.

Keeping a critical eye on activities enhances pride in the quality of work produced. Practicing good housekeeping helps.

Constructive criticism can come from management overview tours administered by the Operations Self Assessment Section. These tours bring a manager from one area into an area outside his or her expertise. The outside manager may be asked to view scheduled plant activities or a special discipline. The idea is that someone from outside the workplace, with a fresh perspective, will spot items of concern that were overlooked by the manager who works there. Attention is given to the following:

- work habits
- radiological protection
- environmental protection
- task site tidiness
- equipment conditions
- labeling
- safety

The results of the tour are documented and evaluated by Operations Self Assessment. Corrective action, if needed, is initiated by Operations Self Assessment. Results of the tours are trended.

Another good practice is the use of goals. In order to constantly improve individual and group performance, goals are necessary. Performance Management System goals and Total Quality goals may be used to advantage.

A goal can be defined as anything your employee is consciously trying to achieve. The goal should be specific, challenging, and acceptable to the employee. A specific goal results in a higher performance level than does either no goal or a generalization such as "do your best." Once a goal is accepted by the employee, a hard goal results in a higher level of performance than does an easy goal.

Performance indicators are necessary to monitor progress toward your goals. You may be able to use data WID furnishes to regulators as your indication of performance. WID is required to report to regulators various performance

indicators such as plant availability, backlogged Plant Work Requests, and worker radiation exposure. If this information is not suitable for measuring progress toward your individual or group goals, look for other readily available data that you can track.

Once you have a performance indicator in statistical form, display progress toward your goal at an appropriate work station. This serves as a constant reminder to your employees.

Accountability

Employees and their supervisors are held accountable for operating performance. If appropriate, include operating performance indicators in Performance Management System appraisals.

Management Training

The MAST program provides formal supervisory and management training that meets or exceeds corporate and regulatory requirements. MAST training applies equally well to managers, Operations supervisors, supervisors of technical support personnel, and non-technical supervisors.

Ongoing technical training is provided for facility operators and support personnel who perform functions associated with safety-related systems and components.

It is a good practice for you to coach and develop your employees. This reinforces the knowledge gained through formal training.

Planning for the Environment

Many precautions are taken at the WIPP to prevent the release of hazardous substances to the environment. The water discharged from the WIPP to the sewage lagoon is sampled periodically for oil, toxic substances, and chemicals. The lagoon is monitored according to WP 02-505, Sewage Discharge Monitoring. Used oil at the site is disposed of per WP 02-502, Used Oil Management. Other deliberate actions taken to prevent hazardous releases to the environment are detailed in MAS-125, "Environmental Protection."

Fitness for Duty

Part of good administration is evaluating your employees for fitness for duty, both as they report for duty and throughout their shift. Steps for acting on fitness-for-duty observations

are given in WP 15-078, "Fitness for Duty." Good supervisor practices for dealing with this issue are detailed in MAS-112, "Administrative Requirements."

CRITICAL INCIDENT EFFECTIVE BEHAVIOR

Occurrence: In preparation for a site-wide inspection, several teams had walked down site areas in search of potential safety violations. After these tours, an individual from outside the organization was called upon to perform an independent tour. The individual found an exposed fluorescent lamp fixture in a critical location. Safety rules require hanging fluorescent bulbs to be covered so a bulb cannot fall down. In this case, the translucent plate was missing from the bottom of the fixture. A number of people looking for errors had walked under the fixture and not noticed the problem.

Impact: 1) An unsafe condition that had gone undetected was immediately made safe, and 2) a problem that could have caused a safety violation was solved prior to the inspection.

Lesson learned: Someone from outside your organization can see things in your area that you and your employees fail to see.

D. SHIFT ROUTINES AND OPERATING PRACTICES

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify good practices for monitoring facility conditions.
2. Identify good practices for maintaining employee attention to duties.
3. Given a scenario, evaluate the manager's effectiveness in monitoring good watch-standing practices.

With appropriate attention to facility conditions, abnormal conditions or adverse trends can be identified in time to prevent malfunctions. It is important that abnormal conditions be recognized early.

Operations uses several techniques to formally monitor facility conditions. Data sheets are used to document the extent of operator tours of equipment. Formal routines are established for standing watch over controls and equipment. Professional conduct and safe conduct are emphasized.

If you work on site, you and your employees can help:

- Employees should promptly report any suspected equipment abnormality to their supervisor, if available, or to the Central Monitoring Room (CMR).
- Supervisors should promptly report any suspected abnormality to the CMR.

Safety Practices

Professional conduct means taking the extra time to follow rules for industrial safety and radiological safety. Safety is always more important than production.

Industrial safety policy on such items as the wearing of personnel protection devices is contained in WP 12-1, "WIPP Safety Manual." Radiological safety policy is found in the "Westinghouse Radiological Controls Manual." Many of the practices detailed in these manuals are emphasized in conduct of operations policies.

WP 04-AD3002, "Conduct of Shift Operations," requires operators to safely access facility components. If permanent access such as a ladder or catwalk is not provided, a formal means of access is used. This might be a temporary ladder, scaffolding, or a lift. Climbing or walking on facility components can result in personnel injury or damage to equipment.

While on shift tours of the facility, operators ensure safety chains are in place. Doors are also checked. Approval of the cognizant Operations supervisor is necessary for any door to be propped open that serves as a fire door, security barrier, or ventilation barrier.

Operator Inspection Tours

Each shift operator tours the equipment assigned to his or her watch station at least once per shift to note any conditions that could affect facility operations.

The tour is normally made early in the shift, before the operator attends to other duties, so that the operator can become familiar with the status of equipment. Each operator should be familiar with equipment on the watch station that is in operation, standby, or out of service. This information helps the operator respond to problems that may come up with equipment during the shift.

The operator also uses sight, sound, and smell to detect anything unusual with equipment:

- -vibration
- -noise
- -quiet
- -odor
- -temperature

In areas of high activity, or where problems exist, more frequent tours may be necessary.

Operators also look for deficiencies in the watch area such as the following:

- -fluid leaks
- -safety hazards
- -open electrical panels or components
- -mobile objects
- -housekeeping problems
- -inoperative lighting
- -doors that do not close properly
- -broken or missing labels

If a deficiency is found, a Plant Work Request is initiated per WP 04-AD3014, "Work Authorization."

It is a good practice for each employee to regularly tour his or her area of responsibility. Do not allow deficiencies to go unreported.

Log Sheets

Operators use log sheets to formally inspect important facility equipment at least once per shift. The log sheet lists each piece of equipment to be checked for a particular shift position along with the normal range for each variable checked. This information allows the operator to readily recognize normal and out-of-specification readings. The equipment is listed in the same order in which it is encountered during a normal operator tour of the area.

If a variable is found out of range, the variable is circled in red. The operator logs the reason for the abnormality, notifies the cognizant supervisor, and takes actions necessary to restore the variable to normal.

Log sheets serve the following purposes:

- identify small problems before they become big problems
- enable operators to spot short-term trends and correct deficiencies
- help reconstruct events leading to malfunctions
- facilitate shift turnover and the training of new operators
- provide written guidance on the extent to which equipment and areas should be inspected during routine tours

Attentive use of the log sheet ensures that no variable is overlooked. The sheets are reviewed at least once per shift by a CMR operator or a cognizant supervisor.

Operator tours are periodically monitored by supervisors to ensure the tours are comprehensive.

Should log sheets be used outside of Operations? In general, data sheets can help by defining the extent of monitoring necessary for complex equipment or systems. For simple systems, a narrative log may suffice.

Concurrent Activities

Maintenance activities, facility modifications, and

abnormalities have an impact on other tasks assigned to shift operators. Instead of letting tasks go uncompleted, operators are required to request direction from management if concurrent activities will prevent completion of an assigned task.

This is a good practice for all employees. If unforeseen events will keep you from completing an assigned task, request direction from your manager before deciding not to pursue the assignment.

Response to Indications

An out-of-specification instrument reading is due to one of two causes: 1) the measured variable is out-of-specification, or 2) the indication is faulty.

To be on the safe side, all out-of-specification indications are considered to be caused by out-of-specification variables. This is common sense in light of our goal to find and correct little problems before they become big problems.

The principle of believing your indications has broader applications. Believe the first signs of trouble. Evaluate other available information relating to the indicated condition. Never assume the first indication is in error. Check other indications, if possible.

For example, if the temperature gauge on a car shows red, stop the car. Look for fluid overflow from the radiator to confirm the gauge reading. Continuing to drive with the gauge indicating hot could cause major engine damage.

Resetting Protective Devices

Each wiring circuit in your home likely is protected by a circuit breaker. The breaker prevents damage by automatically cutting off power to the circuit if demand for power is too great. This automatic shutoff is called a trip. Trips usually happen when you are running too many appliances (iron, vacuum cleaner, hair dryer, etc.) at once. All of a sudden, the appliances stop. To restore power, the circuit breaker must be reset to ON.

There are many devices at the WIPP that act in a similar protective fashion. A tripped protective device is often the first indication of an equipment problem. In line with the practice of believing your indications, every trip of a protective device is treated as if the trip were caused by an out-of-specification variable (such as demand for power). The operator is required to visually inspect the equipment and make an attempt to understand the cause of the trip before the

device is reset.

Resetting any tripped protective device without checking for a cause can result in equipment damage.

Key Control

Keys that are used routinely by Facility Operations are controlled using a record system per WP 04-311, "Facility Operations Key Control." A record is maintained of who is using what key. Other keys at the WIPP fall under WP 11-6, "Lock and Key Control Plan."

Authority to Operate Equipment

Report activities that affect equipment to the equipment custodian. In general, the equipment operator and the operator's supervisor need to be aware of any activity that has the potential to affect plant equipment. These notifications normally are made as part of a procedure or Plant Work Request.

The cognizant Operations supervisor may specify general activities (such as housekeeping) that may be performed without informing the Operations supervisor.

Operations has special authority to operate equipment in abnormal situations. During emergencies, operators may take necessary immediate actions required to protect equipment, personnel, and public safety, without initiating a procedure change.

Shift Operating Bases

Each shift operator is assigned to an operating base. This is the area to which he or she returns if not performing other assigned duties. Each base is equipped with office equipment necessary for the operator to maintain procedures and references. Necessary communication equipment is also maintained at the operating base.

The reasons for maintaining an operating base apply outside of Operations. Roving employees are easier to locate and supervise if you establish the expectation that they will return to a specific area in between duties. If an employee is expected to maintain procedures, some means for doing so must be provided.

Potentially Distractive Written Material and Devices

Control areas are designed to be free of distractions. For an operator monitoring a control panel, distractions can delay or prevent recognition of an irregular indication. To minimize distractions, the following are prohibited from use by on-duty operators:

-written material unrelated to Operations
-entertainment devices such as radios, televisions, tape players, computer games

Written materials related to operator duties may be read. These include training bulletins, technical manuals, and operating experience information. Supervisor judgment is required to ensure that the operator's primary duties are not compromised.

Outside of Operations, it is a good practice to prohibit the use of entertainment devices and written material unrelated to the job. The use of written material related to the job should be encouraged. Reading material that relates to one's duties can focus employee attention on those duties instead of diverting attention away from the job. Idle time is not free time.

Operator Dress Standards and Grooming

Our personal appearance has a strong influence on how our performance is perceived by our customers, regulators, suppliers, and vendors. Professional behavior is complemented when you wear clothing appropriate for your position. A well-groomed personal appearance gives the impression of efficiency and friendliness.

Clothing worn by operators should not be tight enough to restrict movement nor loose enough to snag moving machinery.

Dress should be appropriate for personnel safety:

- Footwear worn on site should be substantial, resistant to punctures, and resistant to penetration by liquid.
- Length and bulk of hair should neither interfere with vision nor pose a hazard to the wearer in potential emergencies. Hair and beards can defeat the design fit of respiratory equipment and protective headgear.
- Shorts, tank tops, and open-toed shoes leave skin unprotected in the event of an accident.

Slogans, symbols, and diagrams not related to the facility are as distracting on articles of clothing as when posted on a

facility wall. Clothing worn at work should not include such distractions.

You, as a manager/supervisor, set the standard for dress that others follow. Maintenance of a neat appearance contributes to employee pride. Professional pride is an essential part of the image we wish to convey to the public and to our customers.

Fitness, Alertness, Attention to Duty

Distractions in the work area cause inattention to detail. Inattention results in errors and omissions.

To avoid inattention, the work area needs to be free of potentially distracting activities such as horseplay. Non-job related discussions should not detract from professional responsibilities.

Another cause of inattention is discourtesy. Discourtesy disrupts teamwork and generates animosity. Fellow employees and persons from other work groups should be treated with courtesy. If difficulties are encountered in interfacing with others, each individual involved should attempt resolution in a courteous, professional manner. If the difficulty persists, the individuals should request assistance from their managers.

A primary activity of shift operators is the observation of equipment, controls, and displays. A missed detail can return as a bigger problem later.

Attention to detail is also important outside of Operations. Missed details result in a lower quality product or service. How free is your work area of potential distractions?

Obviously, professionalism plays a role in the willingness of employees to give full attention to their job duties. The Westinghouse Conduct of Operations Manual encourages shift operators to develop, commit to, and publish a formal statement of professionalism.

Record Maintenance

To be of any use, records must be:

- -complete
- -legible
- -accurate
- -understandable

If any one element is lacking, the record is of little or no use. Facility records are used for trending, analysis of abnormalities, budgeting, auditing, and a number of other

uses.

In Operations, the operator responsible for maintaining a log or data sheet is responsible for signing and dating his or her portion of the record. By signing, the operator is accepting responsibility for the veracity of the log or data sheet. For the sake of completeness, all blanks on data sheets are filled in with the required information or marked not applicable (NA). Charts from instrument recorders are marked with date, time, recorder identification number, and operator initials daily. If someone analyzing the recorder chart has a question, the operator can be identified by his or her initials.

For more information on records, see the "Log Keeping" section of this module and MAS-119, Document Control and Storage.

Housekeeping

Good ownership requires good housekeeping. This means taking action to clean and preserve plant areas, systems, and components. Each shift operator is responsible for the cleanliness and orderliness of his or her watch station.

Good housekeeping enhances industrial safety and radiological safety. Housekeeping also helps keep operators aware of potential problems. For example, a shift operator who wipes up a few drops of oil from underneath a pulley one week will notice when there are more drops than were found before.

Housekeeping is just as important outside of Operations. Establish the expectation that a job is not complete until the housekeeping is done.

Hold each of your employees responsible for housekeeping in his or her area of responsibility.

E. WORK AREA ACTIVITIES

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify good work area activities.
2. Identify work area activities to avoid.
3. Given a scenario, evaluate the manager's effectiveness in maintaining professionalism in the workplace.

At most nuclear process sites, the control room is the most critical operating station. Activities must be businesslike and deliberate. The atmosphere must be conducive to safe and efficient operation; the consequence of error is great.

There is no room for a casual visitor. The visitor must be let in through a locked door or series of doors. The business reason for the visit must be explained before permission is granted to enter the control area. If wearing a hard hat, the visitor may be asked to remove it (to eliminate the risk of the hard hat falling onto a panel and knocking the controls askew).

Your work area likely is not as critical. However, the principles governing activities in a nuclear process control room can be used to improve efficiency in your work area.

Formality is needed to control work area activities whenever an error could jeopardize personnel safety, harm the environment, or result in significant financial loss.

Area Access

Limit work area access to those persons on official business only. People who are not in the work area for a business reason can distract those who are. One way of controlling access is to challenge visitors by asking, "May I help you?" Establish the expectation that your employees will challenge visitors with an offer of assistance.

Areas from which equipment is operated require stricter control, especially if the equipment affects personnel safety or is complex. These areas should be clearly identified. Entry should be granted only by persons knowledgeable and

responsible for operation of the equipment. Limit entry to persons who need to be in the controls area.

Persons who are unfamiliar with equipment in your area can inadvertently trip a switch, obscure an indicator, or distract the equipment operator. Bystanders can cause mistakes. You can prevent accidents by keeping bystanders away from equipment controls.

Professional Behavior

Encourage your employees to display professional behavior in the work area; to conduct all activities in the work area in a disciplined manner. Activities in the work area should be limited to those activities authorized by management.

Non-professional behavior in the work area is behavior that does not pertain to the duties at hand or behavior that is lax. For a control panel operator, any of the following would be non-professional behavior:

- leaning on a control panel
- facing away from the control panel
- engaging in horseplay
- playing a game
- reading non-work related literature

Performing activities in a disciplined manner improves attention. If the control panel operator consistently monitors the assigned control panels, the operator will be able to detect any change in indication at the earliest opportunity.

Errors can result when an employee does not feel qualified to perform an activity. Encourage your employees to speak up if they do not feel qualified to perform an activity. **No one should attempt an activity for which he or she does not feel qualified.**

Other Distractions

Distractions cause errors. There are three common distractions that can be minimized or eliminated in areas where work is complex or involves personnel safety:

- personal phone calls
- dining
- noise

When your employee is making a personal phone call, the employee is not giving full attention to duties in the work area. In critical work areas, forbid personal phone calls except in an emergency.

The preparation and consumption of food in a critical work area likewise distracts. Have your employees use a designated dining area. Liquids pose a special hazard to equipment; a beverage inadvertently spilled on a control panel can short out the panel. At no time should liquids be consumed in an equipment control area.

Keep noise at a minimum in your work areas. It's harder to concentrate in a noisy area.

Monitoring Equipment

Although much of the WIPP's major equipment is monitored by Operations, the same equipment monitoring rules apply to critical equipment used in other departments.

Often downtime can be minimized or prevented by closely monitoring and trending equipment indications to detect potential problems early. If foreseen, problems can usually be prevented.

Take all reasonable actions to clear equipment alarms. The intent of an alarm is to signal that an operating variable has been exceeded. The safe and efficient method of conducting business is to operate equipment within its design limits. To properly clear an alarm, the alarming variable is restored to within the alarm limits.

Do not allow alarm circuits to be bypassed or defeated. Defeating an alarm is equivalent to unplugging your alarm clock. Consider the consequences of defeating an alarm:

- If the alarm is false, the equipment operator is deprived of warning should the alarm limit be exceeded.
- If the alarm is actual, equipment can be damaged and personnel safety can be jeopardized.

If an alarm is verified as false, have the alarm repaired or its setpoint adjusted.

If computer systems or automated systems provide functions that protect personnel safety, ensure there are backups for those protection functions in case the automated system fails.

Administrative Duties

Personnel assigned to monitor equipment can be distracted by other duties. Administrative duties assigned to such personnel should be minimized. Activities such as required reading or procedure reviews should not be a major portion of the responsibilities of personnel who monitor equipment.

Some administrative duties are better performed away from the equipment area by someone who is not responsible for operating equipment. If an administrative task is required of someone charged with monitoring or operating equipment, a good practice is to have someone else assume responsibility for the equipment.

Authorization to Operate Equipment

Unauthorized operation of equipment can cause errors. The authority for operating equipment in your work areas should be controlled. This control can be procedural. For example, operations procedures specifically authorize operators to operate control area equipment.

Ownership

Encourage an attitude of personal ownership of the work area among your employees. Ownership enhances employee pride and attention to detail.

Ownership covers a wide range of activities, from good housekeeping to trending equipment indications. A good owner:

- initiates corrective action for deficient equipment
- wipes up fluid leaks
- maintains systems within specified limits

Actions you can take to promote ownership among your employees can be found in MAS-104, Responsibility and Authority.

F. COMMUNICATIONS

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify criteria for using formality in oral communications.
2. Identify good practices for giving/receiving oral instructions.
3. Describe why accurate oral communications are important.
4. Given a scenario, evaluate the manager's effectiveness in practicing good oral communication in the workplace.

Inaccurate transmission of important information causes delays and errors. It is surprisingly easy to make inadvertent mistakes in oral communication. Words and numbers easily discerned when read often are difficult to discern when spoken. For example, when casually read aloud, UVFS Fan 74-B-043A sounds confusing. Here are three different ways of pronouncing this component:

1. You-vee-ef-es fan seventy-four-bee-oh-forty-three-ay
2. You-vee-and filtration fan seven-four-bee-zero-four-three-ay
3. Underground ventilation and filtration system fan seven-four-bee-zero-four-three-alpha

No. 3 is the most understandable for the listener. In the first two examples, the alpha-numeric identifier 74-B-043A is pronounced as written; eight and "A" sound alike. The letter "A" is specified in the third example by using a phonetic identifier.

Most everyday communications do not require the formal structure described in this section. Using formality in oral communication is important if personnel safety is involved or the subject is complex. A formal communications structure ensures that your instructions are clear, minimizing the likelihood of a human performance error by the speaker or the receiver. Using formality helps you avoid failed transmission of information.

Here are some guidelines for formal oral communications when

you are the sender:

- Identify yourself and your intended receiver. Ensure you know to whom you are speaking, both by name and by position.
- Use concise statements; avoid terms that have more than one meaning.
- Do not issue instructions for more than one task at a time. If possible, ask the receiver to perform the first task and call back for further instructions.
- Have the person you are talking with repeat the instruction to you, either verbatim or paraphrased.
- Consider following up with written guidance.
- Identify equipment by label name and component identifier.
- Use specific terms. Avoid slang. Avoid verbs that may easily be mistaken for other verbs.

DO NOT Use:	Use Instead:
decrease	lower
increase	raise
pressurize	raise the pressure
de-pressurize	lower the pressure
reduce	lower

- Don't abbreviate noun names. Pronounce the entire term instead of pronouncing its acronym; underground ventilation and filtration system instead of you-vee-ef-es.
- When using alpha-numeric identifiers, use phonetics. The phonetic alphabet is shown in Appendix A.
- Unless your directions are brief and straightforward, put the directions in writing. If more than one or two tasks are to be performed, consider putting the instruction in writing.
- Where applicable, refer the receiver to a procedure in which the instructional steps are written.
- When expressing control bands, do not use "plus or minus." For example, 30°F ± 5°F should be spoken "25 to 35 degrees Fahrenheit."
- If the response is correct, affirm the response. If incorrect, repeat the instruction.

Similar guidelines apply to the receiver of oral instructions:

- Identify yourself by name and title. Ensure you know the name and title of the person giving the instructions.
- After the instruction is spoken, repeat the instruction back, either word-for-word or paraphrased. If the instruction is general rather than specific, paraphrase.
- If you do not understand the instructions, ask for clarification.
- Write down complex names and numbers of components.
- Ensure the sender acknowledges your reply.
- When the task is complete, report the completion to the task supervisor or inform the supervisor of the difficulties.
- If the oral instruction is to perform a step in a procedure, obtain a copy of the procedure.
- If you cannot follow the directive or believe you cannot follow the directive, say so. If the sender disagrees, share your concerns with your manager.

Try to be uniform in your use of verbs. A Word Usage List is attached to the site Operations Procedures Writers' Guide (WP 15-7).

Reporting Abnormal Conditions

When reporting abnormal conditions, use the following guidelines:

- Speak deliberately and distinctly.
- Identify yourself and your location.
- Describe the nature, location and severity of the problem.
- Unless directed otherwise by the CMR, stay on the line.
- If conditions warrant immediate evacuation, call the CMR following evacuation.

Use of Radios and Telephones

Portable radios are available for use at the WIPP in mobile point-to-point communications.

Point-to-point communications over the radio or telephone should be formal. Answer the phone or radio with your name and

position. This is more professional than "hello" and saves the caller the trouble of asking who you are.

If you are the caller, likewise begin the conversation by stating your name and position. If you are at a remote location, state the location. Once stated, identification does not need to be repeated with each message.

Prior to using two-way radios, check the operability of both units. This will save a trip back if the radios don't work.

Some equipment is sensitive to electronic interference by radios. Areas where radios might interfere with equipment are posted. Radios are normally not used in these areas.

Emergency Communications

The WIPP public address (PA) system, which is controlled from the Central Monitoring Room, is the primary means of providing emergency notifications at the WIPP.

The emergency notification capability of the system is demonstrated monthly. Announcements over the PA system are kept to a minimum -- an abundance of announcements could reduce the impact of emergency announcements.

It is important that everyone on site be able to hear the PA or emergency signals. If your employees will be working under conditions that preclude hearing emergency signals, arrange an alternate means for quickly notifying employees in the event of an emergency.

G. CONTROL OF ON-THE-JOB TRAINING

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify criteria for using formality in on-the-job training (OJT).
2. Describe why formal OJT controls are needed.
3. Identify good practices for conducting OJT.
4. Given a scenario, evaluate the manager's effectiveness in establishing OJT.

On-the-job training is an important tool for introducing new hires to their responsibilities and for introducing new responsibilities to existing staff. Use formal controls for on-the-job training if, 1) the task is difficult and frequently performed, or 2) improper performance of the task could impact personnel safety. Examples of such tasks include:

- operating your section's equipment or systems, such as a forklift
- performing a complex procedure

The purpose of using formal controls is to avoid mistakes made by unqualified personnel. Formal controls provide structure and ensure that trainees' time on shift is effectively used.

A formal OJT routine provides the trainee with the required skills and knowledge before the trainee is assigned to perform the task independently.

If there is a training program for the job, ensure that the program specifies duties the trainee must perform while on shift. Both the instructor and the trainee should understand what is required for each item.

In selecting a Subject Matter Expert (SME) for on-the-job training, take into account communication skills, technical knowledge, and the ability to provide the trainee with hands-on experience. The SME's role is crucial to the OJT program; it is the SME who ensures that training and qualification is conducted in an effective manner.

Prior to performing a task, the trainee should discuss with the SME the steps of the task and any necessary precautions. If the task is procedural, the trainee should demonstrate actions to be performed by pointing to each object that will be manipulated and explaining the step.

Whenever a trainee performs a task, the SME should observe the trainee to ensure the trainee does not make an error.

Instruction should continue beyond the trainee's first performance of the task. Just because a trainee has performed a task once does not mean he or she is aware of all of the potential problems associated with the task. It is a good practice for the SME to talk through the task each time the trainee is to perform the task.

When the trainee needs to complete a record associated with the task, the SME should verify the recorded information is correct. If any equipment or system indications are out of specification, the consequences of allowing the indications to continue unchecked should be discussed.

On-the-job training should be suspended immediately whenever the SME deems it necessary to ensure personnel safety. If an abnormal condition arises, it is up to the SME to decide whether the trainee should assist.

Formally document completion of OJT so that the trainee can progress to learning other tasks. If the OJT is part of a formal training program, include the documentation with the record of the trainee's classroom training.

Not all OJT tasks need be performed under actual conditions. It may be desirable to have the trainee discuss, simulate, or walk through the task, depending on significance. In some cases, actual performance of the task may be impractical. Radiological conditions and equipment availability should be considered when deciding on whether actual performance is needed.

The recommended OJT sequence is as follows. Depending on significance of the task, some steps may not apply.

1. Trainee is provided with OJT materials:

    - instructions on use of OJT materials
    - scheduled OJT completion dates
    - OJT objectives
    - supporting study material (prints, procedures, manuals)

2. Trainee studies OJT materials.

3. If practical, instructor demonstrates proper performance of the task while discussing potential consequences of

error.

4. Trainee conducts, simulates, or discusses task under supervision of instructor.

5. Instructor corrects performance shortfalls observed and helps trainee learn from mistakes.

6. When confident that task is mastered, trainee requests evaluation. The evaluation may be more effective if the SME is someone other than the instructor.

7. SME schedules session.

8. SME uses OJT criteria to assess trainee's knowledge and skill.

9. If knowledge and skill are satisfactory, SME signs for satisfactory completion of OJT. If not, SME identifies areas for further study or practice.

10. Trainee's line manager is informed of outcome in order to make qualification decisions or arrange remedial training.

11. When deemed complete, satisfactory completion of OJT needs to be recorded.

The trainee and the SME need to know in advance what the criteria are for successful completion of the OJT. Written OJT materials need to clearly state the knowledge, skills, or tasks the trainee must demonstrate to satisfactorily complete the training. Prior to starting OJT, the trainee should know relevant safety practices, job responsibilities, and administrative procedures. It is important that the training include potential problems and the actions necessary to correct those problems.

Any OJT program you use should be evaluated for effectiveness. Feedback can be obtained from the SMEs, trainees, and recently qualified workers.

H. INVESTIGATION OF ABNORMAL EVENTS

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify the prescribed sequence for investigating events.
2. Identify the types of events that should be formally reviewed.
3. Identify practical management applications for the event review process.
4. Given a scenario, evaluate the manager's effectiveness in reviewing an event.

Mistakes present opportunities for learning. If we learn enough from a mistake or a near mistake, we can prevent a recurrence.

DOE 5000.3A, "Occurrence Reporting and Processing of Operations Information," requires formal reports for specific abnormal events. Many of these events involve departments other than Operations. WP 12-918, "Reporting of Occurrences in Accordance with DOE Order 5000.3A," requires investigation of all reportable events. WP12-921, "Investigation of Events," provides instructions for formally reviewing an event.

The steps used to investigate a reportable event can be used to assess events that are not reportable, but that may provide valuable lessons. These steps are as follows:

1. Determine whether the event should be reviewed.

   Whether an event should be reviewed depends on the potential benefit. Any event, good or bad, for which a detailed analysis would benefit WID should be reviewed.

2. As soon as possible after the event has stabilized, arrange a meeting to gather facts about the event.

   Assign a knowledgeable individual the responsibility for collecting essential information and assembling the information for review. Someone who was not involved in the event may be more objective. A timely meeting minimizes the likelihood of lost information or

unavailable observers of the event. It is important to gather information while facts are still fresh in mind.

3. Gather relevant information.

   Determine who was involved or has any knowledge of the event. Consider asking people to write down what they saw or heard. Collect these statements before the fact-finding meeting -- collaboration greatly lowers the value of a statement. Find out what the initial work area conditions were. Gather pertinent documents such as an equipment log, work permit, or radiological survey.

4. Use the fact-finding meeting to clearly document the sequence of events.

   Have those attending the meeting chronologically reconstruct the event from the period just prior to the event. List pertinent actions and equipment status.

5. If the event was undesirable, determine whether the immediate actions taken were satisfactory to mitigate the event and prevent a recurrence. If the event was desirable, determine whether the actions taken were satisfactory to ensure recurrence.

   Further actions may be necessary to accomplish the desired result in a timely manner.

6. Analyze the response of equipment and personnel involved.

   Compare actual response and expected response of personnel and equipment. Examine adequacy of procedures and factors affecting human performance. If applicable, compare the event with previous investigations of similar events.

7. Determine, and validate causes of the event.

   Pinpoint the initiating factor that if corrected will prevent or ensure recurrence.

8. Within two weeks, propose corrective actions with estimated completion dates.

   Corrective actions can take the form of procedure changes, training, design modifications, or changes to administrative controls.

9. Prepare a written report describing the event, the impact of the event, its causes, and the proposed corrective actions.

   It is important that lessons learned from an event be shared with those who could benefit. Be sure to include

the scope of the potential benefit to WID.

10. Ask your department head to see that appropriate information from the event report is included in training materials.

    Notify Human Resources Development and Total Quality about events that are appropriate for inclusion in MAST, Lessons Learned, or Successful Professional modules.

11. Review the report for indications of a trend.

    A single event can indicate a larger problem such as inadequate procedures or consistent human performance errors. If warranted, recommend action to correct the trend.

    Conversely, a good practice trend such as consistent procedural compliance could be indicated. If warranted, recommend action to reinforce the good practice trend.

The formal investigative process has several practical management applications:

- a procedure goes particularly smooth or particularly rough
- one crew consistently performs a task better or worse than another crew
- something out of the ordinary enhances a process or detracts from the process
- an employee achieves an outstanding performance appraisal
- a piece of equipment performs longer than expected with no major repairs

CRITICAL INCIDENT
EFFECTIVE BEHAVIOR

Occurrence: An operator opened two valves to eliminate the pressure in a liquid coolant system prior to scheduled maintenance. When the valves were opened, an estimated one gallon of 50% ethylene glycol solution spilled onto the pavement south of the Compressor Building. Because ethylene glycol is classified as a pollutant, the spill was reported and investigated.

Impact: The investigation showed that the potential for a reportable release of ethylene glycol to the environment exists in all building coolant systems that use the chemical. Even a vehicle engine cooling system can spill a reportable amount. The analysis recommended that Engineering evaluate

replacing ethylene glycol with a substitute coolant that is not classified as a pollutant.

Lesson Learned: A single event can indicate a larger problem or trend.

I. NOTIFICATIONS

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify the procedure that governs notifications of the DOE and other government agencies.

2. Identify who has responsibility for occurrence notifications at the WIPP.

3. Given a scenario, evaluate the manager's effectiveness in ensuring that an occurrence notification is completed.

It is the responsibility of all employees to see that notifications to the DOE and other government agencies are made in a timely manner.

Employees who witness a reportable event should notify the CMR first, then their supervisor. Supervisors who witness a reportable event should notify the CMR first.

Instructions for occurrence notification are included in General Employee Training. Central Monitoring Room operators and others with reporting duties undergo further training on the topic.

The procedure that governs notifications at the WIPP is WP 12-918, "Reporting of Occurrences in Accordance with DOE Order 5000.3A." DOE Order 5000.3A is "Occurrence Reporting and Processing of Operations Information."

J. CONTROL OF EQUIPMENT AND SYSTEM STATUS

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify good practices for ensuring that equipment and systems are operated according to facility design.
2. Identify practices to avoid in the control of equipment and system status.
3. Given a scenario, evaluate the manager's effectiveness in monitoring the effectiveness of configuration control measures.

It is important that the configuration of plant systems and equipment remain within design requirements during plant operations, modifications, maintenance, and testing.

To operate the facility and adhere to design requirements, operators need to constantly be aware of components that have been removed from normal status. Examples are: a normally closed valve that is temporarily open, an electrical switch bypassed for repair, or an equipment alarm that is turned off for modification.

It is imperative that equipment at the WIPP, or any other nuclear facility, be controlled according to design. Configuration is controlled by use of procedures, engineering drawings, logs, turnover sheets, and training. For specific information on control of equipment, see the following sections of this module:

- Tagouts
- Independent Verification
- Log Keeping
- Shift Turnover

Operations is responsible for maintaining proper plant configuration at the WIPP. Any change of status to major plant equipment must be authorized by the Facility Operations Shift Supervisor.

Equipment and System Alignments

Systems and equipment important to facility and personnel

safety are formally aligned. The initial alignment of system valves, switches, or breakers is documented. After any change in the normal alignment, the original lineup can be used to return the alignment to normal status.

After a system has been removed from service, individual components are checked for proper alignment prior to placing the system in operation. The alignment document also makes it easy for operators to document deviations from reference alignment.

Operational Limits Compliance

Operational Safety Requirements (OSRs) for the WIPP are stated in WP 02-9, "Waste Isolation Pilot Plant Final Safety Analysis Report." These requirements address those operations and conditions that, unless controlled, could result in hazards to employees, the public, or to the environment. The OSRs cover non-radiological hazards as well as radiological hazards. Administrative controls for ensuring compliance with OSRs are defined in WP 02-9 and WP 04-AD7001, "OSR Administrative Plan."

The only instance in which exception may be taken to the OSRs is to mitigate a plant emergency that requires extraordinary steps.

Surveillance procedures periodically demonstrate operability of OSR-related equipment. Log sheets in the Central Monitoring Room provide a permanent record of plant indications. WP 04-AD7001 includes guidelines to assist plant operators in complying with OSRs. Operators are also trained in OSR specifics.

Compliance details are reported monthly to WIPP management by the OSR coordinator.

Equipment Deficiency Identification and Documentation

Anyone who notes a problem with a system, facility or component at the WIPP is required to initiate a Plant Work Request by WP 04-AD3014, "Work Authorization." The initiated Plant Work Request is forwarded to the appropriate Operations manager, who has the equipment caution tagged or danger tagged if warranted.

The tags and corresponding entries in shift logs identify deficient equipment to operating personnel.

Work Authorization

Equipment maintenance or modification is authorized in writing by the appropriate Operations manager. Active and released work requests are tracked in a Work Authorization Log that is kept in the control area.

Equipment Post-Maintenance Testing and Return to Service

Plant equipment is tested after maintenance to demonstrate that it operates in the same acceptable manner as it did before maintenance. WP 04-AD3014, "Work Authorization," calls for equipment to be tested following maintenance.

Normally, the equipment can be tested using normal operating procedures or surveillances. Step-by-step instructions can be written as part of the maintenance work plan if needed.

Alarm Status

Keeping track of out-of-service alarms is of particular importance in operating the facility within its design requirements.

At the WIPP, a log is used to maintain configuration control of all Central Monitoring System (CMS) alarm points. If the monitoring or alarm function of a CMS point is turned off, the point is logged by Operations per WP 04-AD3007, "CMS Point Scan/Alarm Check Removal Authorization." Use of this procedure enables Operations to maintain configuration control of CMS points.

A good operating practice is to identify and solve problems before an alarm sounds. If the operator is aware that an alarm is not in service, he or she can more closely monitor other indications of the affected variable. Conversely, if the operator is unaware that the alarm is disabled, a significant problem can go unnoticed.

Temporary Modification Control

Modifications to equipment, if not formally controlled, can degrade the basic design of the equipment. A temporary modification is an alteration to equipment or systems that will remain in place during operation for six months or less. WP 04-AD3012, "Temporary Plant Modification Control," establishes logs to ensure that operators are aware of all temporary plant modifications and the associated affects on equipment or systems. The log is audited monthly by Operations staff to ensure that each temporary modification is still needed.

Because of the potential for degrading design function, temporary modifications are documented and approved by a design authority and a safety authority. Procedures and other configuration control documents are temporarily changed if needed. Temporary modifications are reviewed with the same rigor as permanent changes to ensure that the basic design of a component or system is not undermined.

Distribution and Control of Equipment and System Documents

Facility engineering drawings and specifications are controlled documents. The Configuration Management & Information Integration section keeps Operations aware of any changes made to the facility design basis. Changes are also sent to procedure reviewers, Maintenance, safety reviewers, and others involved in operations-related activities.

Configuration Management & Information Integration also controls vendor manuals for equipment installed at the WIPP. Copies are maintained in Engineering File Resources.

Operating procedures, maintenance procedures, training documents, and licensing documents must be consistent with the physical configuration described in the design basis documents.

K. LOCKOUTS AND TAGOUTS

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify reasons why equipment and systems are tagged out.
2. Identify good practices for isolating equipment for maintenance.
3. Given a scenario, evaluate the manager's effectiveness in monitoring the tagout/lockout program.

When equipment is removed from service for maintenance, the equipment is isolated from its sources of energy to prevent component damage and injury to personnel. A source of energy such as electricity or water under pressure is a potential hazard for anyone who is performing maintenance.

Special tags are affixed to controls that isolate energy to components or systems. Energy isolation devices that if connected would pose a risk of personnel injury are tagged and locked in the isolated position. For example, breakers are locked open, valves are locked closed. The tags and locks formally control the removal from service of equipment and systems at the WIPP.

The principle is to securely isolate hazardous energy upstream of any planned maintenance activity. If the energy source could injure personnel, a red danger tag is affixed. If the energy source could cause only equipment damage, a yellow caution tag may be affixed.

These controls are mandated by 29 CFR, 1910.150, "Control of Hazardous Energy Source (Lockout/Tagout)."

WP 04-001, "Equipment Tagout/Lockout," provides a logical sequence for documenting the tagging and locking process. The procedure also includes steps to ensure that work on a system does not begin until equipment positioning is complete and tags are in place.

Proper locking and tagging allows operators to maintain operability of systems adjacent to isolated systems; the isolation devices redefine system boundaries.

Operators use facility design information to determine where to isolate systems and components while maintaining the design configuration.

You usually will see more than one lock on a tagged isolation device -- a multiple locking device hung by operations and succeeding locks hung by maintenance technicians. Each maintenance technician who breaches the isolated component or system hangs his or her own lock. Before starting work, the maintenance technician re-verifies that the component or system is isolated and without energy. The isolation is reconfirmed each time the system is re-entered after the technician has been absent from the site.

Specific training on locking and tagging procedures is provided to operators and maintenance technicians.

Every WID employee is responsible for use of proper lockout and tagout steps to ensure his or her safety prior to breaching a high-energy component or system.

To reduce the likelihood of human performance error, tags and locks are hung by one operator and checked by a second operator on a separate tour.

Tagouts are also logged. The active tagout log is reviewed weekly to ensure that no equipment is needlessly tagged.

The removal of locks and tags is also governed by procedure. Locks are removed in reverse of the order in which they were affixed. When maintenance is complete and nonessential items are removed from the area, the maintenance technicians remove their locks from the energy isolation device. By removing a maintenance lock, the technician is affirming that his or her breach of the locked out system or equipment is secure. An operator removes the Operations lock and tag last.

L. INDEPENDENT VERIFICATION

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify good independent verification techniques.
2. Identify tasks for which Operations uses independent verification.
3. Identify good self-checking techniques.
4. Given a scenario, evaluate the manager's effectiveness in using and monitoring independent verification techniques.

Formal independent verification techniques provide Operations with a high degree of reliability in ensuring the correct position of critical valves, switches, and circuit breakers. Similar techniques can help you whenever you want to be sure that a task is done right.

Simply stated, independent verification is having one person review a step performed by another. If both persons agree on the correctness of the action, the step is considered verified.

In practice, independent verification is not so simple. Anyone, no matter how proficient, can make a mistake. If your employee knows that you will walk through a step upon completion, the employee may relax his or her attentiveness. A high level of discipline is required on the part of both the performer and the verifier in order for independent verification to work. It is important not to be lax; to understand the reason why a step that was just performed must be checked in detail.

Self-checking should be promoted to ensure your employees positively identify the correct component or object. The intended action and expected response should be reviewed beforehand. Establish the expectation that verification will be performed with a high level of personal integrity and discipline. Ensure that the verifier meets the same qualifications as the performer.

In order for the verification to be as independent as possible, the check must include:

- an actual identification of the object of action
- a determination of the object's desired status
- a determination of the object's actual status

To independently verify the position of an isolation valve, the verifier identifies the valve, reads the procedural requirement for the valve, then checks the position of the valve. Whenever possible, the component positioner and the independent verifier are physically separated; the verifier does not watch the positioner perform the step. The verifier usually makes an independent observation on a separate tour.

Physical Separation

Physical separation helps to avoid problems inherent in non-independent verification. In the example above, were the checker to rely on the operator to correctly identify the valve, a mistake in identification might not be caught. WP 04-AD3005, "Administrative Control of System Lineups," forbids such reliance on observed actions of the positioner.

It is a good practice for the verifier to employ a different means of component identification. If the positioner identified the valve by label and the label was incorrect, the verifier could catch the mistake by locating the valve on a controlled drawing using its precise relation to other valves. A verifier who uses the same indications and methods as the positioner is very likely to make the same oversights.

Performer and verifier are separate jobs. The verifier normally should not repeat the actions of the performer. For example, if the performer closes a valve to stop flow, the verifier should find indications that flow has stopped in addition to observing that the valve is closed. If the actual status of an object cannot be verified due to unfamiliarity with the device, seek assistance from a subject matter expert to resolve the uncertainty. Vendor information may be helpful for specific devices.

Another good practice is to emphasize separation of performance and verification assignments. In the case of a valve lineup, the supervisor marks up two identical checklists. One list is given to the positioner to perform the alignment. The positioner indicates by initialing and dating each entry that the associated component is in the listed position. When the alignment is complete, the second checklist is given to the verifier, who does not see the positioner's markup.

The verifier indicates by initialing and dating each entry that the associated component was verified to be in the listed

position. If a discrepancy is found, the verifier does not initial the component on the list. Nor does the verifier reposition the component. Instead, the component is circled in red to bring it to the attention of the supervisor.

When both tours are complete, the supervisor compares the two checklists. If there is no discrepancy, the verification is complete. If there is a discrepancy, the supervisor resolves the issue. At no time during this process does the verifier communicate directly with the positioner.

Operations Verifications

In Operations, independent verification is used whenever a reasonable potential exists for component mis-positioning. In some situations, such as where the radiation dose is significant, requirements for independent verification can be waived by the task supervisor.

Independent verification of component alignments at the WIPP is governed by WP 04-AD3005. This procedure gives detailed instructions for verifying the position of valves, switches, and circuit breakers.

Operations also independently verifies the disconnection and reconnection of circuitry to critical plant components. When a technician disconnects a wire inside a control panel, the operator verifies that the correct wire is being removed. Extraordinary efforts are made to specifically identify the wire to be removed. The verifier checks for correct identification of the building, the cabinet, the panel, the terminal board, and the wire. This detailed information is compared with the plant work request.

Such disconnections are verified using WP 04-AD3012, "Temporary Plant Modification Control." If the modification will disable a protective device (such as an alarm or temperature switch), the cognizant Operations supervisor considers whether alternate protection is needed. Needs for procedure changes and training on the temporary modification are also considered. Operations documents and tracks temporary plant modifications using shift logs.

Surveillance testing may substitute for verification techniques if the test conclusively proves the status of the object being verified.

Process variables such as flow or voltage can also provide helpful indications. However, caution should be used in discerning whether an alternate flow path or other factors would cause the process indication to be misleading.

Self-Checking

Using the following techniques can minimize oversights and double work by emphasizing deliberation. Many of these techniques apply to those who verify as well as to those who perform.

1. Stop -- take time to consider the intended action. Be aggressively suspicious.

2. Locate -- identify the correct object using visual, audible and tactile senses.

3. Sense -- if hazardous, point to the object. If not hazardous, touch the object. Do not operate.

4. Verify -- reconfirm the identity of the object.

5. Anticipate -- consider the expected responses from the action about to be taken. Consider action to take if the expected response is not received.

6. Perform -- lift the electrical wire; torque the bolt; manipulate the component.

7. Observe -- ensure that the action taken has resulted in the expected result. Be ready to react to unexpected results.

General Use of Verification Techniques

When should you use independent verification techniques? Whenever the consequence of error is great. In deciding whether to use verification techniques, consider whether an error could:

- result in personnel injury
- result in equipment damage
- result in the unintended release of radioactive material or toxic material
- result in radioactive contamination
- incur unexpected high costs
- damage public perception of the WIPP

When required to meet a regulatory requirement, independent verification is included in the associated procedure. For example, independent verification is used in the following Operations procedures:

WP 04-AD3012, "Temporary Plant Modification Control"
WP 04-AD3005, "Administrative Control of System Lineups"
WP 04-001, "Equipment Tagout/Lockout"

Independent verification is also useful for less critical tasks. Verification techniques can be used to:

- troubleshoot a procedure
- ensure that a complex task is performed correctly
- ensure that an unfamiliar task is performed correctly
- stop/prevent work that comes back because it was performed unsatisfactorily the first time

CRITICAL INCIDENT
EFFECTIVE BEHAVIOR

Occurrence: Some electrical equipment was tagged out the night before maintenance was scheduled to begin. An independent verifier, dispatched on a separate tour that night, discovered a tag affixed to the wrong circuit breaker.

Impact: The correct breaker was tagged out before maintenance was to begin. A potentially serious personnel hazard was avoided.

Lesson Learned: Physical separation of performer and reviewer is important.

CRITICAL INCIDENT
EFFECTIVE BEHAVIOR

Occurrence: While preparing electrical cable for installation underground, an alert technician noticed a discrepancy in the rating marked on a reel of cable. A rating of 10,000 volts was marked at 2-foot intervals along the cable. A rating of 15,000 volts was printed over the other markings in two locations. The installation required 15,000-volt cable.

Impact: The cable was returned to the vendor and replaced with the correctly rated cable. Because of the technician's attention to detail, a potential safety hazard was avoided.

Lesson Learned: Each technician should verify replacement material is correct before the material is installed.

CRITICAL INCIDENT
INEFFECTIVE BEHAVIOR

Occurrence: Switches for two devices were placed in the BYPASS position to protect against damage during a power outage. After the outage, the switches were left in the BYPASS position.

Impact: The switch misalignment went undetected for two weeks. Because the devices serve a safety function, the switch realignment should have been independently verified after the outage.

Lesson Learned: Use independent verification techniques whenever an error could have significant impact.

M. LOG KEEPING

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify good practices for log keeping.
2. Identify practices to avoid in log keeping.
3. Given a scenario, evaluate the manager's effectiveness concerning log keeping.

Operating logs are the chronological legal record of facility operations. Their purpose is to provide an accurate history.

The Operations Department maintains four separate narrative logs. The primary log, which is kept in the CMR, is the CMR Operations Log. Others are the Waste Handling Operations Log, the Underground Service Log, and the Facility Operations Log.

The narrative logs have the following uses:

- transfer of information from shift to shift
- analysis and trending of equipment performance
- analysis of facility problems
- problem tracking
- review of important task performance

The narrative logs are intended to be used as a tool by operators, managers, and support staff to verify that facility systems operate according to design.

Log Keeping Rules

Because narrative logs are official records, formality is important. Here are some of the rules for log keeping:

- Entries are made in black waterproof ink.

  Other colors reproduce poorly. Water-based ink fades if the ledger gets wet. Pencil is not permanent.

- Each sheet is dated at the top. Each entry begins with the time of day.

  Entries are consecutive with no blank lines in between. If an entry is made out of chronological sequence, it is marked as a late entry beside the time the entry is made.

- If a correction is necessary, a single line is drawn across the incorrect entry. The correction is initialed and dated.

  No information is erased or covered up. The uncorrected information and time of the change can be important for future reviews.

- The cognizant Operations supervisor attests to the accuracy and adequacy of the previous shift entries by signing the log at the end of the shift.

  Narrations are written in sufficient technical detail to enable another operator or a system engineer to understand the problem.

- Log books are considered legal records.

  Entries are limited to factual information.

- Log entries are made in a manner so as to provide a complete history of each event including the final disposition of the event.

  Events are recorded as they occur. Recording details when they are fresh in mind ensures accuracy.

- At shift change, the oncoming operator or supervisor reviews log entries from at least the two previous shifts.

  Upon completion of review, the reviewer initials the left margin of the log.

Log Contents

Information recorded in the CMR log includes the following:

- facility condition changes
- abnormal configurations
- change in status of important equipment
- reportable events
- start and stop of equipment tests

- security incidents
- shift reliefs

Logs are open for perusal by management and support staff. This type of equipment and system information is of value to Maintenance and Engineering as well as Environment, Safety, and Health.

Operations log keeping is addressed in WP 04-AD3002, "Conduct of Shift Operations," and WP 04-304, "Log Entries and Record Retention Procedure."

Separate narrative logs are maintained for operator positions that are manned part time. Such logs ensure pertinent information is passed from operator to operator.

Second-Party Entries

Anyone can make a log entry with the approval of the individual responsible for that log. The responsible individual does not have to agree with the second party entry, but does need to sign beneath the entry to show that permission was granted for the entry.

Other Uses for Log Keeping Rules

Many of the formal rules for log keeping are good practices for creating permanent, audit-ready documents:

- Use black waterproof ink.
- Ensure the date is marked on each page.
- If the information is sequential, clearly identify entries made out of sequence.
- If a correction is necessary, draw a single line across the incorrect entry. Initial and date the correction. Do not erase or cover up the incorrect entry.
- Ensure that the person responsible for the information attests to its accuracy and adequacy by signing the document.
- Write narrations in sufficient detail.
- Limit entries in legal records to factual information.
- If a problem is recorded in an official document, ensure the final disposition of the problem is also recorded.

- To ensure accuracy, record events in a timely manner while details are fresh in mind.

- Use a chronological narrative to help in turning over complex ongoing work to the person relieving you.

For more good practices for keeping records, see MAS-119, "Document Control and Storage."

N. OPERATIONS TURNOVER

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify good practices for operations turnover.
2. Identify the Operations Department shift turnover sequence.
3. Given a scenario, evaluate the manager's effectiveness in monitoring good operations turnover practices.

In multi-shift tasks, responsibilities for ongoing work and ongoing watches are assumed by the oncoming shift. The transfer of responsibilities and knowledge from off-going to oncoming personnel is called shift turnover.

Turning over the operation of complicated equipment from one person to another can quickly and easily lead to errors. The off-going person is aware of potential problems, special alignments, components that don't work, and maintenance that is in progress. The oncoming person is fully unaware.

If the oncoming person misunderstands the turnover or is not made fully aware of critical variables, problems are likely.

A formal, disciplined turnover ensures that the oncoming person is made fully aware of factors affecting his or her duties. A comprehensive exchange of operating information must occur between the off-going and oncoming operators.

Rules for turnover are a matter of procedure for shift operators. However, these guidelines apply equally to anyone at the WIPP who is authorized to operate equipment that is turned over from one person to another. This could include personnel who work with Radiation Safety, chemistry, transportation, and others.

- If equipment conditions are changing or unusually complicated conditions exist, postpone turnover until conditions are stable.
- Do not relieve an off-going operator until the equipment he or she is responsible for is in a stable condition.
- Use checklists to aid the turnover. A good checklist denotes:

-equipment in service
-tests in progress
-status of critical operating variables
-other documents the oncoming operator needs to review

- Keep a written record of equipment operating variables to aid in turnover. Include time of observation, minimum and maximum acceptable limits, and normal operating range. Note any abnormal condition and the action taken.

- Have the off-going operator and the oncoming operator together review controls and equipment indications in detail to verify checklist items. Include the following in the discussion:

  -running equipment
  -inoperable equipment, including instrumentation
  -safe limits for operation
  -tagged equipment
  -maintenance work in progress
  -reasons for any alarms
  -unusual events, if any, during the last 24 hours
  -temporary modifications installed on previous shift
  -temporary procedure changes

- Do not assume operational duties unless you are physically and mentally fit to do so.

- When both the oncoming and off-going operators agree that the oncoming operator is cognizant of equipment conditions, the oncoming operator should state that he or she is assuming responsibility.

- If you are a supervisor assuming shift duties in a turnover, brief equipment operators and support staff after assuming the shift. Discuss planned activities, pertinent shift orders, unusual conditions, and shift routines.

- Review turnover checklists daily to ensure accuracy.

- If a short-term relief is necessary during shift, ensure a thorough turnover is conducted.

Applying the Rules to Your Area

Rules for formal turnover were established for use in areas in which the controls for many different types of equipment are centralized; a control room or a control panel. For non-Operations areas that are control-intense or indicator-intense, all of these rules apply. For the turnover of simple equipment, some but not all of the rules apply.

A key question to answer is: **what is the consequence of error in the operation of equipment for which you and your employees are responsible?**

As an example, most of these rules do not apply to the operation of common office equipment. Office equipment is normally shut down at the end of the work day, which makes end-of-shift turnover unnecessary. Also, office equipment is designed to be safe when left unattended.

Many of these rules would apply to the ongoing operation of laboratory equipment involving hazardous chemicals. If the equipment is simple, a turnover checklist may not be necessary. It is a good practice, however, for both the oncoming and off-going chemists to discuss the operating equipment. When both agree that the oncoming chemist is cognizant of safety variables, the oncoming chemist should state that he or she is assuming responsibility. The other rules apply in similar fashion. In this scenario, 1) an error could have personnel safety consequences, and 2) the equipment will be operating beyond normal business hours.

Some, but not all, of these rules apply to a simple transfer of responsibility for a vehicle left idling:

- You want the vehicle to be in stable condition, not in motion, with the parking brake applied and the transmission in PARK.
- For the record, write down the mileage and fuel tank level.
- It's a good idea to inform the other driver of any feature that doesn't work: turn signal, wiper blade, headlamp.
- The new driver needs to ensure that he or she is physically and mentally fit to drive.
- The new driver should verify operation of the headlamps, turn signals, wipers, and horn.
- Ask the other driver, "Are there any questions?" When you both agree that the new driver is cognizant of the peculiarities of driving the vehicle, the new driver takes over.

Operations Department Shift Turnover

Operations Department shift turnovers are covered in WP 04-AD3002, "Conduct of Shift Operations." Turnover checklists are used for each operator station as well as for shift supervisors.

Prior to coming on shift, each operator reviews narrative logs and log sheets associated with the assigned station. Log sheets are used to record operating variables for equipment and areas for which the operator station is responsible. The oncoming operator discusses with the off-going operator each unusual or significant log entry.

After the log review, the two operators discuss the current status of the station, using the turnover checklist as a guide. The following are noted as applicable:

- Plant Work Request or Maintenance work in progress
- Plant Work Request or Maintenance work awaiting retest
- any test or retest in progress
- reason for any equipment that is out of service
- abnormal conditions or system alignments
- procedures in progress
- potential problem areas

When the oncoming operator and the off-going operator agree that the oncoming operator is cognizant of station conditions, the oncoming operator formally assumes the station.

Following individual turnovers, the cognizant Operations Supervisor discusses the following with shift operators and support staff:

- planned activities for the coming shift, including individual responsibilities
- problem areas
- maintenance and related plant activities
- testing
- plan of the day

O. OPERATIONS ASPECTS OF FACILITY CHEMISTRY AND UNIQUE PROCESSES

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify the relationship of chemistry to operating limits for the WIPP.

2. Identify operating procedures for which some knowledge of chemistry is helpful.

Chemistry processes are essential to the operation of many DOE sites and facilities. The importance of establishing good relations between chemists and operators to handle chemistry processes is addressed in DOE Order 5480.19 and the Westinghouse Conduct of Operations Manual.

However, at the WIPP, nc chemistry is involved in processing a product. The CMR instruments do not monitor any chemistry variable.

There is one important non-process interchange between chemists and operators. Operators sample waste bins for flammable gas buildup using WP 05-WH7601, "Bin Flammable Gas Concentration Surveillance." The sample is analyzed by a chemist in the Analytical Technology Lab. If the flammable gas concentration were to exceed the test limit, operators would purge the gas from the bin.

Some knowledge of chemistry is helpful to the operator. A basic understanding of pH is needed to operate the site chlorination equipment and recognize unfavorable conditions in the sewage lagoon. These activities are covered by the following procedures:

- WP 04-WD1010, "Domestic Water System Operation"
- WP 04-GC1201, "Sewage Lagoon System Operation"

A few chemical analyses are performed at the site to demonstrate compliance with environmental regulations. For example, the sewage lagoon is sampled for the presence of organic compounds. Details on environmental compliance are found in MAS-125, "Environmental Protection."

P. REQUIRED READING

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify good practices for required reading.
2. Identify required reading practices to avoid.
3. Given a scenario, evaluate the manager's effectiveness concerning required reading.

A formal means of distributing essential information is a useful management tool.

Each operating group at the WIPP maintains a notebook for required reading material. Items in the notebook designated "immediate reading" are required to be read prior to assuming responsibility for an on-shift Operations position. Everyone who reads the specified material attests by initialing a control sheet that he or she has read and understands the material.

The manager of each section designates who is required to read material by what date. The section manger reviews the completion status of required reading monthly.

Operators are required to read the following as well as other material assigned by the section manager:

- procedure changes
- equipment design changes
- project policy information
- industry operating experience information
- information necessary to keep operators aware of facility activities and conditions

Required reading rules are covered in WP 04-AD3002, "Conduct of Shift Operations."

Good Practices for Required Reading

- Use required reading to transmit important job-related information to selected employees.

  This should include project information, facility

activities that affect your section, and changes to procedures and other controlled documents.

- Mark "immediate reading" on items that need to be read prior to assuming duty. An example would be a temporary procedure change.

- Mark "controlled copy" reading documents "For Information Only."

- Establish the expectation that required reading assignments will be completed on time.

- Review status of required reading assignments each month.

- Keep a required reading control sheet with the required reading notebook. Include in assignments date of issue and required completion date.

Required Reading Practices to Avoid

- Using required reading for information that can be informally distributed.

  Magazine articles, general employee information, copies of correspondence, and other low-priority material does not need formal distribution.

- Throwing away completed reading material.

  Keep these materials on file for at least two years. The file can be used for reference by trainers, procedure writers and others.

Q. TIMELY ORDERS TO OPERATORS

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. State the purpose for timely orders to operators.
2. Identify good practices for shift orders.
3. Given a scenario, evaluate the manager's effectiveness in monitoring the use of timely orders.

Written orders are used to provide management direction in a timely manner to operators who work on different shifts. An operator who works from late at night to just past dawn may not see or interact with the cognizant Operations Supervisor.

By using a written order, the supervisor gives a directive one time instead of trying to meet personally with operators on all three shifts every day. Written shift instructions are issued by section managers as necessary to communicate with shift employees.

Shift instructions can include the following:

- information on special operations
- administrative directions
- special data collection requirements
- priorities for work
- policy announcements
- other daily matters

These instructions are of two types, daily and long term. Operators must review daily instructions prior to assuming a shift position. Long-term instructions are reviewed when issued, when changed, or every three months. Reviews are documented.

Like required reading, section managers review shift instructions monthly. Those that no longer apply are removed or canceled.

If a shift instruction remains in place for longer than three months, the instruction may be considered for incorporation into an administrative procedure.

Avoid issuing orders that conflict with procedures or change

procedure steps. Procedure changes should be distributed as required reading material.

Since shift work at the WIPP is limited to Operations, most managers and supervisors at the WIPP are able to interface daily with their employees and do not use shift instructions.

If you have occasion to provide essential information to employees on multiple shifts, put the information in writing. Require the employee to read and sign for the information prior to assuming his or her scheduled duties.

For dos and don'ts regarding use of instructions, see MAS-112, "Administrative Requirements."

R. OPERATIONS PROCEDURES

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify reasons why well-written procedures are an asset.

2. Identify techniques for making Operations procedures user-friendly.

3. Given a scenario, evaluate the manager's effectiveness in monitoring the use of operations procedures.

Formality in the operation of the WIPP, to a great extent, is provided through the use of procedures. Procedures are developed for all anticipated operations:

-normal
-abnormal
-emergency
-alarm response
-tests of equipment and systems

The purpose of using written instructions is to ensure the facility is operated according to design.

Well-written procedures are an asset; poorly written procedures are a liability. The probability of error increases greatly with the use of poorly written procedures. In the commercial nuclear industry, deficient procedures and failure to follow procedures contributed to many operational occurrences.

The origination and revision of operating procedures is controlled by the use of WP 15-7, "Operations Procedures Writers Guide." The guide provides consistency in procedure format, content, and wording. Such consistency is essential to achieving a uniformly high standard of operator performance.

Each procedure is written in the sequence in which it is most efficiently performed. The scope of the procedure is clearly stated at the outset. Actions to handle prerequisites are listed prior to the start of the procedure. For example, if a hose must be connected prior to the test, instructions for connecting and checking the hose would come before the instructions for the test. Otherwise, the test would have to

be interrupted to hook up the hose.

Only one action is written per step. This makes the procedure user-friendly; the operator does not have to remember multiple actions to perform a step. Procedures also address other human performance factors, such as component identification. References to components exactly match labels on the equipment. Steps are written to contain only instructions. Other information is segregated into notes, warnings, and cautions.

Steps are written in sufficient detail for the skill level of the user. Too much detail causes the user to skim over text. Too little detail may result in something important being overlooked.

To keep procedures up to date, each operating procedure is reviewed at least every two years to determine if revision is appropriate.

Despite the painstaking effort that goes into procedure preparation and validation, on-the-spot changes sometimes must be made. Operators encounter situations that are not covered by the procedure or that call for action counter to what is in the procedure. If the activity is routine, the activity is stopped and the procedure is immediately changed using a Procedure Change Notice (PCN). For minor technical changes, the PCN can be approved by a qualified operator and the cognizant manager. If the PCN involves major changes, approval is required from the parties who reviewed the initial procedure revision.

Anyone who notes a discrepancy in an Operating procedure should report it. If the discrepancy is technical, notify the appropriate Operations manager. If the discrepancy involves format or is of a non-technical nature, complete a Procedure Change Request (WP Form 2067). If the change is not immediately needed, it will be incorporated into a future revision.

Use of Procedures Outside of Operations

Many tasks outside of Operations are performed according to approved and controlled procedures or Plant Work Requests.

Maintenance procedures, which have unique needs, are written according to WP 10-3, "The Writer's Guide for WIPP Maintenance Instructions." Other procedures are prepared according to WP 15-101, "Preparing, Revising, Reviewing, and Canceling Procedures."

An attempt is made to cover all operational contingencies using normal or abnormal operating procedures. While managers

and supervisors outside of Operations will not likely need special abnormal procedures, it is a good practice to plan for the unexpected. How would a sudden loss of equipment or personnel affect the procedures in use in your area?

If you have questions concerning procedure development for your area, contact Publications and Procedures. Good practices for initiating procedures and getting them approved are listed in MAS-112, "Administrative Requirements." Good practices for controlled documents are listed in MAS-119, "Document Control and Storage."

Sign-Offs and Checklists

Procedures that are critical or complex require the performer to initial the procedure upon completion of each action. The intent is to ensure the performer gives appropriate attention to each step. Sign-offs also mark the progress of the task and aid in turnover. By initialing the step, the performer is attesting that he or she performed the action in a professional manner.

Checkoffs work in a similar fashion. Upon completion of a step, the performer places a check mark by the step instead of signing it off.

These are tools that you can use whenever greater attention to detail is warranted. Have your employees check off or initial each action in a sequence. This works as well for tasks that are non-procedural as it does for procedural instructions.

Checklists can be used to eliminate errors due to oversight. Having your employee check off each action in a sequence prevents the employee from inadvertently overlooking the action or step.

The checklist need not be formal, just a list of the required actions in sequence. A key to making the list work is to be specific; state each action in precise terms. Write no more than one action per checkoff. Having more than one action per checkoff dilutes your protection against inadvertent omissions.

Creation of a good checklist can be compared to making an effective daily TO DO list. A primary function of the TO DO list is to prevent you from omitting important activities due to oversight.

CRITICAL INCIDENT
EFFECTIVE BEHAVIOR

Occurrence: In starting the second pump in a two-pump cooling water system, the indicated system pressure exceeded the limits specified in the procedure. The operator stopped the procedure and notified his supervisor to resolve the discrepancy.

Impact: The procedure was changed to show the higher pressure expected when one pump is already running.

Lesson Learned: If there is a conflict between system indications and procedural expectations, stop the activity until the conflict is resolved.

S. OPERATOR AID POSTINGS

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify reasons why equipment instructions are usually not posted at the controls.
2. Identify techniques for the control of operator aids.
3. Given a scenario, evaluate the manager's effectiveness in monitoring the control of operator aids.

Information posted in the plant should be of a nature to help equipment operators do their jobs. This is why, when you look around a plant area, what you see in print are safety notices and component labels. A cola poster would be a distraction, something not of a nature to help the operator perform his or her duties.

It helps to have certain kinds of information posted in a place near where the information is used. An example would be a drawing showing the out-of-the-way location of a seldom-used control. This kind of posting is called an operator aid. The drawing or document helps the equipment operator perform his or her duties. The aid can be a controlled plant drawing, an informative note, a graph, or an illustration.

Operator aids on site are controlled by WP 04-AD3003, "Control of Operator Aids." Each posting is checked to ensure that it does not conflict with procedures or other controlled documents.

Here is the process used to post an operator aid:

1. The originator proposes the aid to the Facility Operations Shift Supervisor (FOSS).
2. If the FOSS agrees, the aid is produced in two copies.
3. The FOSS verifies the aid is correct, enters the source document on a verification label, signs the label, and affixes the label to the aid.
4. The verification label is approved by the appropriate section manager.

5. The aid is posted.

6. The duplicate aid is placed in the Master Operator Aid Notebook.

The Master Operator Aid Notebook, which is kept in the FOSS office, lists the source document for and location of each aid. The notebook is used to ensure the aids are kept up to date. Every six months, the condition of and need for each aid is evaluated. A new verification label is also prepared and signed. It is important to keep operator aids updated as plant conditions change and equipment is modified -- using an outdated operator aid can have the same consequence as using an outdated procedure.

For some equipment, a posting of the written operating instructions is an operator convenience. An example is a copying machine -- instructions are printed on the machine's front or top cover. However, operator aids for plant equipment operated by approved procedure do not contain instructions. Any operator aid for plant equipment contains information only, not instructions. Posted instructions are appropriate for the copying machine because it is not operated by procedure. Instructions for the operation of everyday office equipment are not procedural; there is no need for an auditable method of operating such equipment.

T. EQUIPMENT & PIPING LABELING

Enabling Objectives

Upon completion of this section, the trainee will be able to perform the following:

1. Identify the qualities of a good component label.
2. Identify reasons why consistency in labeling of components is important.
3. Given a scenario, evaluate the manager's effectiveness in monitoring the plant labeling program.

Good labeling is essential to safe operation. Operators must be able to positively identify the equipment they are required to operate. Maintenance personnel likewise must be able to positively identify components to be maintained. Also, personnel exposure to hazardous materials or radiation is reduced when employees spend less time identifying components.

Improper or inadequate labeling has contributed to many commercial nuclear industry events. The problem is this: even with a well-trained operator or technician following a properly written procedure, error is likely if the equipment labels are inadequate or incorrect.

Labeling is a specialty unto itself. Here are some of the difficulties posed, using valves as an example:

- If the label on a valve is not specific enough, it is hard to differentiate the proper valve from other valves.
- If the label contains too much information, the label is difficult to read and confusing.
- If no valves are labeled in a group of valves, identification becomes a best guess.
- If two identical valves are labeled alike, there's a 50-50 chance of the wrong valve being manipulated.
- If labels are almost alike (only one or two digits different) for two identical valves, one can still easily be mistaken for the other.
- If the abbreviations used on labels are not standardized, misunderstanding can cause errors.

- If successive generations of labels exist on one valve, the valve can be misidentified by out-of-date labels.
- If the label is too small or the print is too small, the label cannot be read from a working distance.
- If the label is too large, it can obscure gauges or other equipment indicators.
- If the label is placed in a location that is out of the normal line of vision, it can be difficult to find.
- If a plastic label is placed on a high-temperature pipe, the plastic can distort, melt, or fall off. Metal labels can be corroded by chemicals.

Uniformity in labeling and system identification at the WIPP is covered in two Engineering procedures. WP 09-017, "Identification of Valves, Pipe, Hangers, and HVAC Dampers" contains standards for the making of equipment tags and labels at the WIPP. Configuration Management & Information Integration assigns a unique identifier to each component. This identifier is used on the component label and, thereafter, in all associated plant documents.

Procedures and controlled drawings refer to components by label name and number to assure uniform identification. This good practice minimizes errors due to lack of agreement in nomenclature between what is on the component and what is in controlled documents. Standard abbreviations for facility systems and locations are also listed in WP 09-017.

WP 09-021, "WIPP Equipment and Instrument Numbering Systems and Registers," gives instructions for formal identification of equipment, instruments, loops, cables, and conduit runs.

Here are some of the qualities of a good component label:

- specifies the system, location, and type of component
- displays a unique identifier
- uses standard abbreviations
- is not duplicated by another label on the same component
- is easily read from a comfortable angle and working distance
- does not obscure gauges or other equipment indicators
- will not corrode, tarnish, melt, or come unglued when mounted in the desired location

Operators making rounds look for labels that are broken, missing, misleading, or confusing. Anyone who spots a broken or missing label should initiate a Plant Work Request to report the deficiency.

Also look for informal labels on plant controls and components. These are typically made with black marker pen, pencil, or labeling tape. The big problem with informal labels is that the operator has no way of knowing whether the marking or tape is the approved nomenclature. This is especially important if an instrument limit or alarm setting is marked on a component.

Labeling discrepancies usually are resolved by the system engineer for the associated equipment or system. New labels are made by Maintenance as part of a Plant Work Request.

Even in non-procedural instructions and drawings, it is a good practice to use the name that appears on the label when referring to components and other items. This helps your employees more easily identify and locate the component or item.

CRITICAL INCIDENT
INEFFECTIVE BEHAVIOR

Occurrence: An electrical problem in a temporary building caused a loss of power to the building. Technicians attempting to solve the problem were thwarted by poor labeling on the circuit breakers -- they could not determine from the hand-writing in the breaker box which equipment was causing the problem. Although the breaker box had been used frequently, the lack of labeling was overlooked until it presented a crisis.

Impact: The building was without power for hours while technicians tested circuits to locate the problem. Had the breaker box been properly labeled, testing of circuits would not have been necessary. This testing imposed unnecessary safety risks on the technicians.

Lessons learned: 1) Do not trust informal labels on important equipment, and 2), proper labeling is important to the safe and efficient operation of the plant.

U. SMART MOVES -- WHAT YOU CAN DO NOW

Here are some actions you can take to make your section or department more effective:

1. Track the amount of time you spend coaching your employees (page 6).

2. Walk through procedures or evolutions with your employees (page 8).

3. Assess the adequacy of goals used in your areas of responsibility (page 9).

4. Check your employees' work areas for potential distractions (page 17, page 20).

5. Review the uses of oral communication in your area (page 24).

6. Use independent verification and self-checking techniques to minimize or eliminate double work (page 42).

7. See that good practices are used for the turnover of responsibilities from one employee to another (page 52).

8. Review required reading practices in your area (page 57).

9. Employ checklists to eliminate oversights (page 63).

10. Ensure that label names are used to identify items in written and oral communications (page 69).

11. Encourage your employees to:

    - report equipment deficiencies (page 14)
    - wear clothing appropriate for their assignments (page 17)
    - practice good housekeeping (page 19)
    - speak up if they do not feel qualified to perform an activity (page 21)
    - assume an attitude of personal ownership of their work areas (page 23)
    - self-check when performing important tasks (page 45)
    - use good log-keeping practices when creating permanent documents (page 48)

V. MODULE REFERENCES

DOE 5480.19 "Guidelines for the Conduct of Operations at DOE Facilities"

DOE 5000.3A, "Occurrence Reporting and Processing of Operations Information"

Westinghouse Conduct of Operations Manual, July 1991

WP 04-3, Operations Administration Manual, July 1992

WP 04-AD, Waste Isolation Pilot Plant Operations Administration Manual, July 1992

WP 15-7, Operations Procedures Writers' Guide

WP 12-921, "Investigation of Events"

WP 12-918, "Reporting of Occurrences in Accordance with DOE Order 5000.3A"

WP 09-017, "Identification of Valves, Pipe, Hangers, and HVAC Dampers"

WP 09-021, "WIPP Equipment and Instrument Numbering Systems and Registers"

MAS-110, "Employee Relations"

MAS-112, "Administrative Requirements"

MAS-119, "Document Control and Storage"

INPO 85-017, "Guidelines for the Conduct of Operations at Nuclear Power Stations"

INPO 84-030, "Generic Round Sheets and Shift Operating Practices"

INPO 87-018, "Operational Communications Verbal"

INPO 87-002, "Tagging Procedures for the Protection of Personnel, Components, and Systems"

INPO 87-003, "Independent Verification"

INPO 84-001, "Operations Narrative Log Books"

INPO 84-008, "Shift Relief and Turnover"

INPO 84-005, "Control of Operator Aids"

INPO 88-009, "System and Component Labeling"

W. PRACTICE TEST

1. A health physics technician preparing a Radiation Work Permit (RWP) is providing an important service. The primary customer for this service is

   a. any potential auditor of the RWP.

   b. Quality Assurance.

   c. the party who requested and initiated the permit.

   d. the technician's supervisor.

   (B.1)

2. A supervisor periodically walks through a routine procedure as it is being performed by his employees. Is this a good practice? Why?

   a. YES -- keeping a critical eye on activities enhances pride in the quality of work produced.

   b. YES -- this allows the supervisor to perform the procedure for his employees.

   c. NO -- walking through procedures is not part of "walking your spaces."

   d. NO -- if the procedure is properly written, the supervisor should not need to monitor it.

   (C.3)

3. If a circuit breaker trips, the appropriate operator response is to

   a. immediately reset the breaker.

   b. visually inspect the associated equipment and attempt to understand the cause of the trip.

   c. shut off the associated equipment, then reset the breaker.

   (D.1)

4. To pronounce OOS (out of service) in verbal communication, say:

   a. ohs

   b. out of service

   c. oh-oh-es

   d. oose (as in loose)

   (F.2)

5. A supervisor initiates formal OJT for operating a new forklift. Is this a good practice? Why?

   a. YES -- formal OJT is required for all tasks.

   b. YES -- formal OJT controls should be used if improper performance of the task could impact personnel safety.

   c. NO -- how to operate a forklift is common knowledge.

   d. NO -- classroom training on this subject is sufficient.

   (G.3)

6. What types of events should be investigated?

   a. only those events specified in DOE 5000.3A

   b. only events for which a department manager requests an investigation

   c. only abnormal events that have the potential to damage equipment or harm personnel

   d. any event, good or bad, for which a detailed analysis would benefit WID

   (H.2)

7. Supervisors who witness a reportable event should first

   a. try to mitigate the event.

   b. notify the CMR.

   c. notify Security.

   (I.2)

8. An electrician who spots a dry crack in a pipe fills out a Plant Work Request. Is this a good practice? Why?

   a. YES -- Maintenance workers should seek out problems in areas other than their own.

   b. YES -- anyone who notes a problem with a system, facility, or component is required to initiate a Plant Work Request.

   c. NO -- only operators should initiate Plant Work Requests.

   d. NO -- cracks that aren't leaking need not be reported.

   (J.1)

9. John Operator, who is sent to unlock some tagged equipment, reports back that a Maintenance lock is on the equipment along with the Operations lock. John's supervisor instructs John to return without unlocking anything. Is this a good practice? Why?

   a. YES -- the Operations lock cannot be removed until the Maintenance lock is removed.

   b. YES -- a Security escort is needed for removal of the Maintenance lock.

   c. NO -- John should remove the Operations lock while the supervisor calls Maintenance.

   d. NO -- John should remove both locks and have the removals verified by a second operator on a separate tour.

   (K.2)

10. Upon completion of a procedure with sign-off steps, an employee is given a clean copy of the procedure with the instruction to walk through the steps and verify that each result of the task is as desired. Is this a good practice? Why?

    a. YES -- it is a good practice to physically separate the assignments of performer and verifier.

    b. YES -- all sign-off procedures should be verified.

    c. NO -- the verifier needs to observe each step as it is performed.

    d. NO -- the verifier should use the same copy of the procedure used by the performer.

    (L.1)

X. ANSWERS AND FEEDBACK FOR PRACTICE TEST

1. c. the party who requested and initiated the permit.

2. a. YES -- keeping a critical eye on activities enhances pride in the quality of work produced.

3. b. visually inspect the associated equipment and attempt to understand the cause of the trip.

4. b. out of service

5. b. YES -- formal OJT controls should be used if improper performance of the task could impact personnel safety.

6. d. any event, good or bad, for which a detailed analysis would benefit WID

7. b. notify the CMR.

8. b. YES -- anyone who notes a problem with a system, facility, or component is required to initiate a Plant Work Request.

9. a. YES -- the Operations lock cannot be removed until the Maintenance lock is removed.

10. a. YES -- it is a good practice to physically separate the assignments of performer and verifier.

If you scored 80 percent or higher on the practice test, you are ready to take the module examination; please proceed to Human Resources Development and Total Quality.

If you scored less than 80 percent on the practice test, please re-read the module and take the practice test again. If you still have questions, contact the Team Leader, Professional Development, or the Manager, Human Resources Development and Total Quality.

Y. APPENDIX

NOTE: The appendix is provided for information only. It is not a source for test questions.

Phonetic Alphabet

Use of the phonetic alphabet minimizes misinterpretation of alphanumeric information during verbal communications.

A: Alpha	N: November
B: Bravo	O: Oscar
C: Charlie	P: Papa
D: Delta	Q: Quebec
E: Echo	R: Romeo
F: Foxtrot	S: Sierra
G: Golf	T: Tango
H: Hotel	U: Uniform
I: India	V: Victor
J: Juliett	W: Whiskey
K: Kilo	X: X-ray
L: Lima	Y: Yankee
M: Mike	Z: Zulu

Numbers

0: zero	5: five
1: one	6: six
2: two	7: seven
3: three	8: eight
4: four	9: niner